
New Combinations in *Campylandra* (Convallariaceae, Convallarieae)

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ABSTRACT. *Campylandra* Baker was published in 1875. Subsequently, various authors have either united it with *Tupistra* Ker Gawler (sometimes recognizing it as a subgenus or section of *Tupistra*) or maintained it as a separate genus. The present authors regard *Campylandra* as a separate genus on account of its having filaments only proximally (vs. almost wholly in *Tupistra*) adnate to the perianth tube, anthers as high as or higher (vs. lower) than the stigma, a shorter style, and a 3-lobed (vs. peltate to mushroom-shaped) stigma; this separation is confirmed by molecular phylogenies. In preparation for the accounts of genera in the Convallariaceae for *Flora of China*, Volume 24, it is therefore necessary to transfer into *Campylandra* 12 species hitherto treated under *Tupistra*, namely: *T. annulata* H. Li & J. L. Huang, *T. chinensis* Baker, *T. delavayi* Franchet, *T. emeiensis* Z. Y. Zhu, *T. ensifolia* F. T. Wang & Tang, *T. fimbriata* Handel-Mazzetti, *T. jinshanensis* Z. L. Yang & X. G. Luo, *T. liangshanensis* Z. Y. Zhu, *T. lichuanensis* Y. K. Yang, J. K. Wu & D. T. Peng, *T. longipedunculata* F. T. Wang & S. Yun Liang, *T. verruculosa* Q. H. Chen, and *T. yunnanensis* F. T. Wang & S. Yun Liang. It is also necessary to transfer two species originally described under a related genus, *Rohdea* Roth, but later transferred to *Tupistra*: *T. tui* (F. T. Wang & Tang) F. T. Wang & S. Yun Liang (*R. tui* F. T. Wang & Tang) and *T. urotepala* (Handel-Mazzetti) F. T. Wang & Tang (*R. urotepala* Handel-Mazzetti). In addition to these transfers, *Campylandra ensifolia* is lectotypified.

The genus *Campylandra* was originally described by Baker (1875: 582) with the single species *C. aurantiaca* Baker. Baker distinguished

Campylandra from *Tupistra* Ker Gawler on the basis of its sessile leaves, presence of staminal filaments, and a smaller stigma. On the other hand, Bentham and Hooker (1883) regarded *Campylandra* as no more than a variant of *Tupistra* with somewhat more developed filaments and a more slender style, and reduced *Campylandra* to synonymy under *Tupistra*. Later, Engler (1887, 1897), Clarke (1890), Krause (1930), Dandy (1933), Chun (1934), Hutchinson (1934), Handel-Mazzetti (1936), Hara et al. (1978), and Conran and Tamura (1998) all recognized *Campylandra* as an independent genus. They evaluated it with varying circumscriptions, but as having, for example, sessile leaves, bracts longer than the flowers, tepals frilled at the margin, anthers positioned higher than or as high as the stigma, presence of filaments and/or a small, trilobed stigma. However, Hooker (1892), Baillon (1893), Franchet (1896), Wang and Liang (1976, 1978), and Huang and Li (1990) all followed Bentham and Hooker (1883) in regarding *Campylandra* as congeneric with *Tupistra*. Among them, Franchet (1896) and Huang and Li (1990) recognized *Campylandra* at the ranks of section and subgenus, respectively.

In the forthcoming *Flora of China*, Volume 24, Liang and Tamura (in press) will treat *Campylandra* and *Tupistra* as separate genera and stress the morphological differences as follows:

Campylandra: filaments proximally adnate to perianth tube; anthers positioned as high as or higher than stigma; style usually 0–1 mm, rarely to 3.5 mm (*C. fimbriata*); stigma small, 3-lobed.

Tupistra: filaments almost wholly adnate to perianth tube; anthers positioned lower than stigma; style 4–12 mm, cylindrical; stigma peltate to mushroom-shaped, 2–7 mm in diameter, fleshy.

According to Huang and Li (1990) and Huang and Hong (1997), *Campylandra* has unimodal karyotypes, and ellipsoid or subspherical, monosulcate pollen grains with reticulate or perforate exine, whereas *Tupistra* has bimodal karyotypes (except in *T. nutans* Wallich ex Lindley: unimodal), and spherical, inaperturate pollen grains with rugulose, verrucose, or gemmate exine. Thus the separation of *Campylandra* and *Tupistra* is more or less supported by karyological and pollen morphological data, although comprehensive karyological and pollen morphological studies are needed to confirm this. The separation of the two genera has also been supported by molecular phylogenies based on both *trnK* (including *matK*) and *rbcL* genes (Yamashita & Tamura, in press). At the present stage, we consider that separation is better than inclusion of *Campylandra* within *Tupistra*. However, the detailed relationship of species and consequent generic circumscription of *Campylandra*, *Gonioscypha* Baker, *Rohdea*, *Tricalistra* Ridley, and *Tupistra* should be reexamined in the future. In the present paper, we propose the following 14 new combinations in *Campylandra* for the treatment in *Flora of China*, Volume 24. These species were hitherto treated under *Tupistra*, but agree with *Campylandra* as defined here. Two of them were originally described under a related genus, *Rohdea* Roth, but were transferred to *Tupistra* in Wang and Liang (1978). The key to genera, generic descriptions, key to species, and specific descriptions of both *Campylandra* and *Tupistra* will be provided in the *Flora*.

Campylandra annulata (H. Li & J. L. Huang) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra annulata* H. Li & J. L. Huang, *Acta Bot. Yunnan.*, Suppl. 3: 51. 1990. TYPE: China. Yunnan: "Cultus in Horto Botanico Kunming. Locus exactus sine cognitus," *D. Y. Xia* 49 (holotype, KUN).

Campylandra chinensis (Baker) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra chinensis* Baker, *Hooker's Icon. Pl.* 19: t. 1867. 1889. TYPE: China. Hubei: "Patung [Badong] district," *Henry* 5023 (holotype, K).

Campylandra delavayi (Franchet) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra delavayi* Franchet, *Bull. Soc. Bot. France* 43: 40. 1896. TYPE: China. Yunnan: "dans le bois à Outchay, près de Ta kouen," *Delavay s.n.* (syntype, P). Hubei: [without locality], *Henry* 5231A (syntype, P).

Campylandra emeiensis (Z. Y. Zhu) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra emeiensis* Z. Y. Zhu, *Acta Bot. Yunnan.* 4: 271. 1982. TYPE: China. Sichuan: Emei Shan, 1800–2500 m, 1 June 1976, *D. Q. Li & Z. Y. Zhu* 29 (holotype, EMA).

Campylandra ensifolia (F. T. Wang & Tang) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra ensifolia* F. T. Wang & Tang, *Bull. Fan Mem. Inst. Biol.* 7: 86. 1936. TYPE: China. Yunnan: "Plant of 6–18 inches. Flowers brown and green, strongly fragrant. Moist shady situations amongst rocks in side valleys on hills to east of Tengyueh, Lat. 25°N., alt. 6–7000 ft.," June 1912 (fl), *G. Forrest* 8455 (lectotype here designated, K).

Wang and Tang cited two syntypes: the flowering specimen cited above (as "type") and the following specimen (as "fruit type"): China. Yunnan: "Shangpa," 2000 m, 21 Oct. 1934 (fr), *H. T. Tsai* 58892 (PE). The latter specimen was preserved in the herbarium of the Fan Memorial Institute of Biology, Peiping (Beijing), which has since been transferred to KUN, NAS, and PE. The specimen at Kew has two inflorescences and is here chosen as the lectotype because flowering material is more useful diagnostically than fruiting material.

Campylandra fimbriata (Handel-Mazzetti) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra fimbriata* Handel-Mazzetti, *Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl.* 59: 253. 1922. TYPE: China. Yunnan: "In pluviisilva frondosa calide temperata juxta vicum Bahan in convalle fluvii Salween, 27°58'[N]," ca. 2600 m, 20 June 1916, *Handel-Mazzetti* 8804 (holotype, W).

Campylandra jinshanensis (Z. L. Yang & X. G. Luo) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra jinshanensis* Z. L. Yang & X. G. Luo, *Acta Bot. Yunnan.* 6: 389. 1984. TYPE: China. Sichuan: cultivated in garden of Sichuan School of Chinese Materia Medica, 450 m, 12 Apr. 1983, *X. G. Luo & Z. L. Yang* 483053 (holotype, EMA).

Campylandra liangshanensis (Z. Y. Zhu) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra liangshanensis* Z. Y. Zhu, in *Z. Y. Zhu & J. L. Zhang*, *Acta Phytotax. Sin.* 19: 521. 1981. TYPE: China. Sichuan: Puge, 2500 m, 12 Nov. 1978, *D. Q. Li & Z. Y. Zhu* 837 (holotype, EMA).

Campylandra lichuanensis (Y. K. Yang, J. K. Wu & D. T. Peng) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra lichuanensis* Y. K. Yang, J. K. Wu & D. T. Peng, J. Wuhan Bot. Res. 9: 40. 1991. TYPE: China. Hubei: Lichuan County, "Che-Le, San-jiao, Yi-Zu," 1100 m, 10 Apr. 1987, *D. T. Peng 0631* (holotype, CPU; isotype, LCDH).

Campylandra longipedunculata (F. T. Wang & S. Yun Liang) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra longipedunculata* F. T. Wang & S. Yun Liang, in F. T. Wang & Tang, Fl. Reipubl. Popularis Sin. 15: 249. 1978. TYPE: China. Yunnan: "Tsin-hung," *C. W. Wang 75985* (holotype, PE).

Campylandra tui (F. T. Wang & Tang) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Rohdea tui* F. T. Wang & Tang, Bull. Fan Mem. Inst. Biol. 7: 284. 1937. *Tupistra tui* (F. T. Wang & Tang) F. T. Wang & S. Yun Liang, in F. T. Wang & Tang, Fl. Reipubl. Popularis Sin. 15: 14. 1978. TYPE: China. Sichuan: "Pao-hsing Hsien [Baoping Xian], Teng-chih-kou," 2460 m, 22 June 1933, *T. H. Tu 4256* (holotype, PE).

The holotype specimen was preserved in the herbarium of the Fan Memorial Institute of Biology, Peiping (Beijing), which has since been transferred to KUN, NAS, and PE.

Campylandra urotepala (Handel-Mazzetti) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Rohdea urotepala* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 57: 272. 1920. *Tupistra urotepala* (Handel-Mazzetti) F. T. Wang & Tang, Fl. Reipubl. Popularis Sin. 15: 14. 1978. TYPE: China. Sichuan: "in saltu profundo tergi Soso-liangde," ca. 2700 m, 25 Apr. 1914, *Handel-Mazzetti 1733* (holotype, W).

Campylandra verruculosa (Q. H. Chen) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra verruculosa* Q. H. Chen, Acta Phytotax. Sin. 25: 69. 1987. TYPE: China. Guizhou: Pingtang, Bairu, 700 m, 13 May 1982, *Q. H. Chen & J. D. Liu 1328* (holotype, HGAS).

Campylandra yunnanensis (F. T. Wang & S. Yun Liang) M. N. Tamura, S. Yun Liang & Turland, comb. nov. Basionym: *Tupistra yunnanensis* F. T. Wang & S. Yun Liang, in F. T. Wang & Tang,

Fl. Reipubl. Popularis Sin. 15: 249. 1978. TYPE: China. Yunnan: "Chao-tung," *H. T. Tsai 50880* (holotype, PE).

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